ADVANCED REACTOR SAFEGUARDS

Onsite Response Force Strategies

Pebble Bed Reactor and Microreactor

PRESENTED BY

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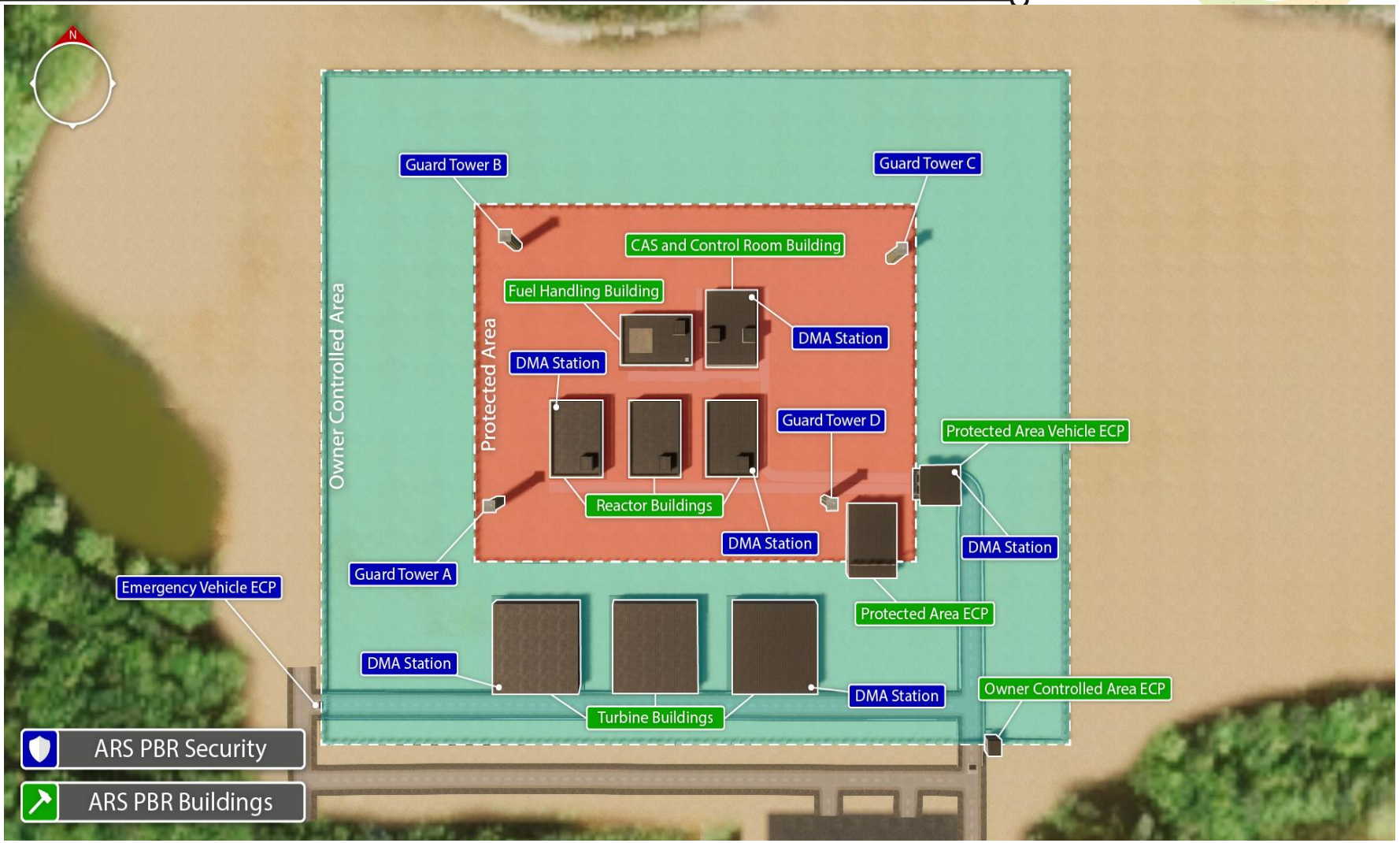
Introduction

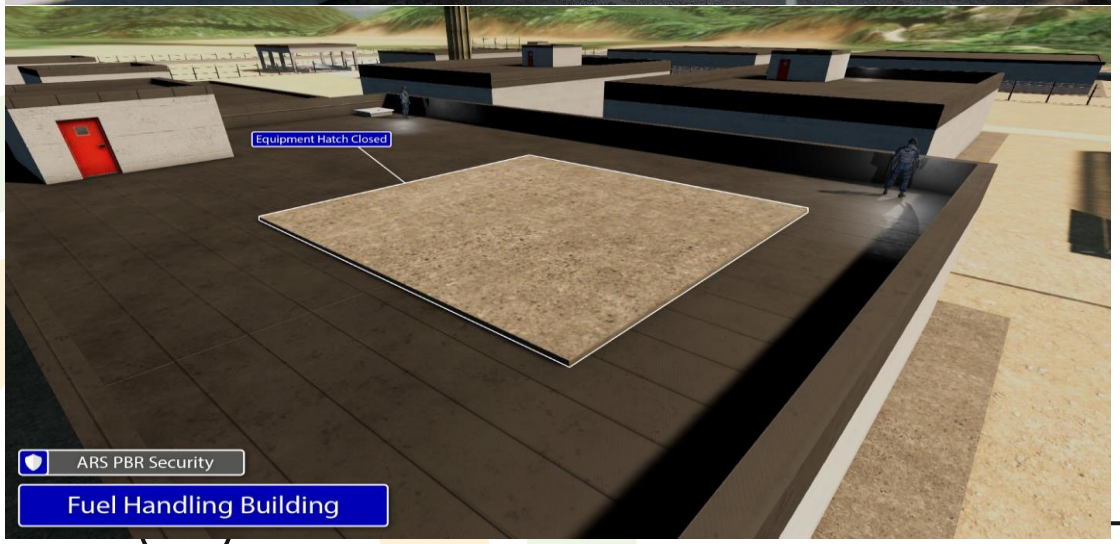
- Previous work under ARS has been focused on offsite response force strategies and remote operated weapon system (ROWS) strategies
- This study focuses on ways to design effective onsite response force strategies
  - Increase cost-efficiencies
  - Increase system effectiveness
  - Meet the intent of NRC regulations
- SMEs with various response backgrounds were brought in to develop strategies for physical protection systems
  - DOE, NRC, LLEA

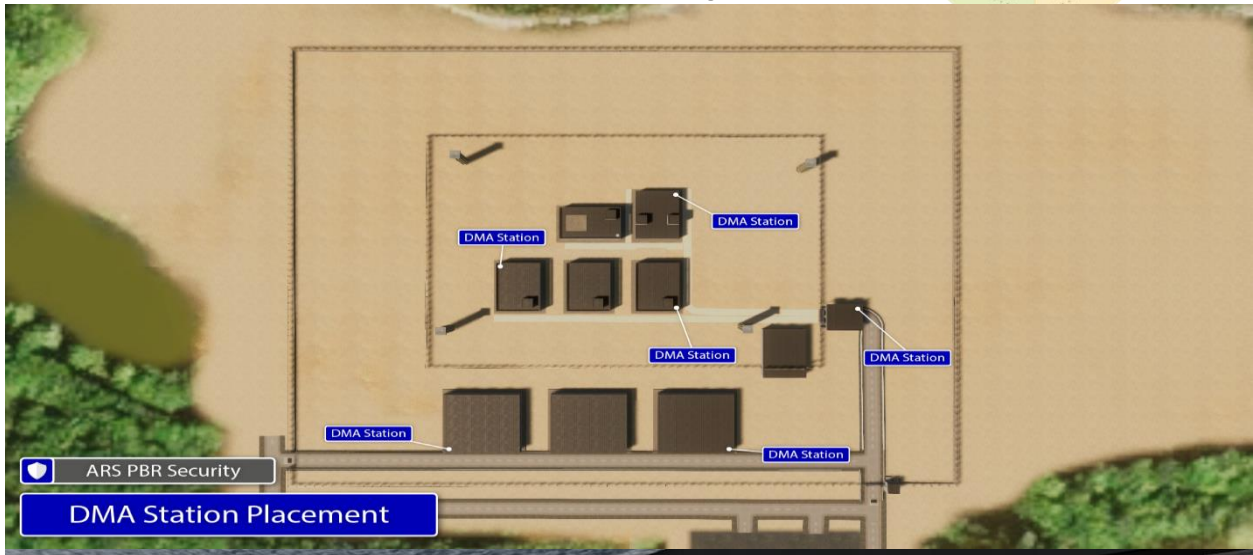
Pebble Bed Reactor

- DMA → External Intrusion Detection
- OCA Boundary
- PA Boundary
- 4 Response Towers
- 1 Roving Guard that can access roofs
- OCA entry control point for large vehicle searches
- PA entry control point for detailed vehicle inspections
- 6 Vital Areas



PBR PPS Attributes





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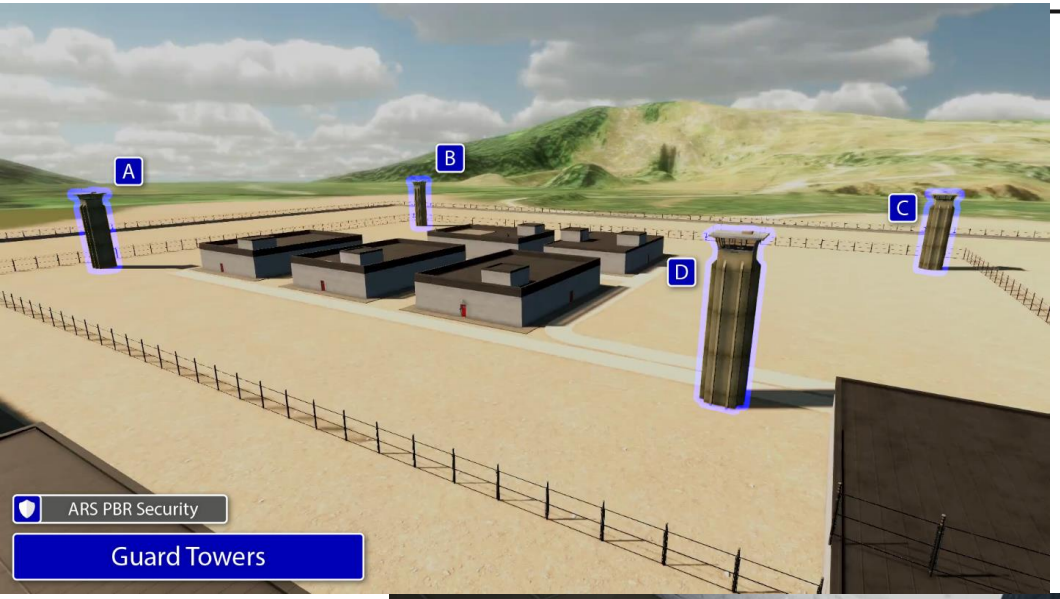
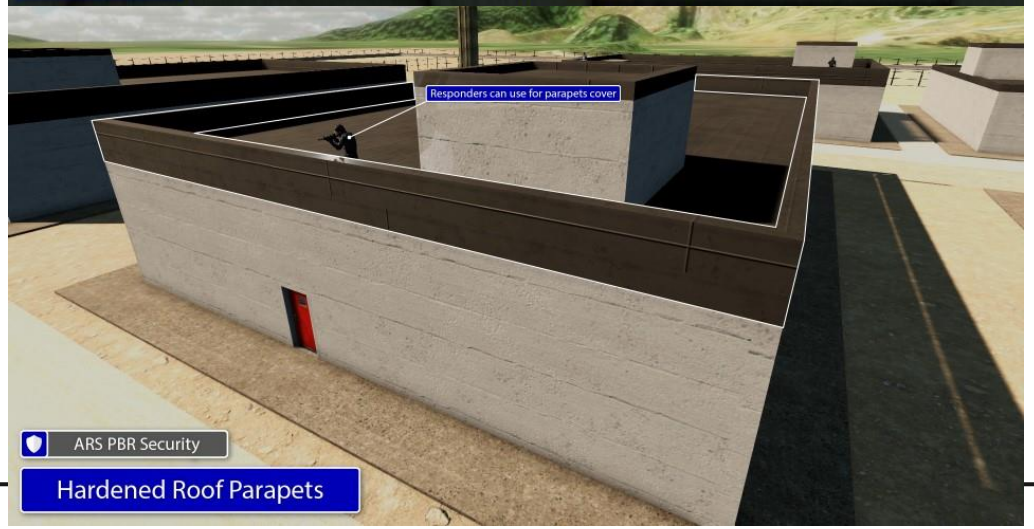
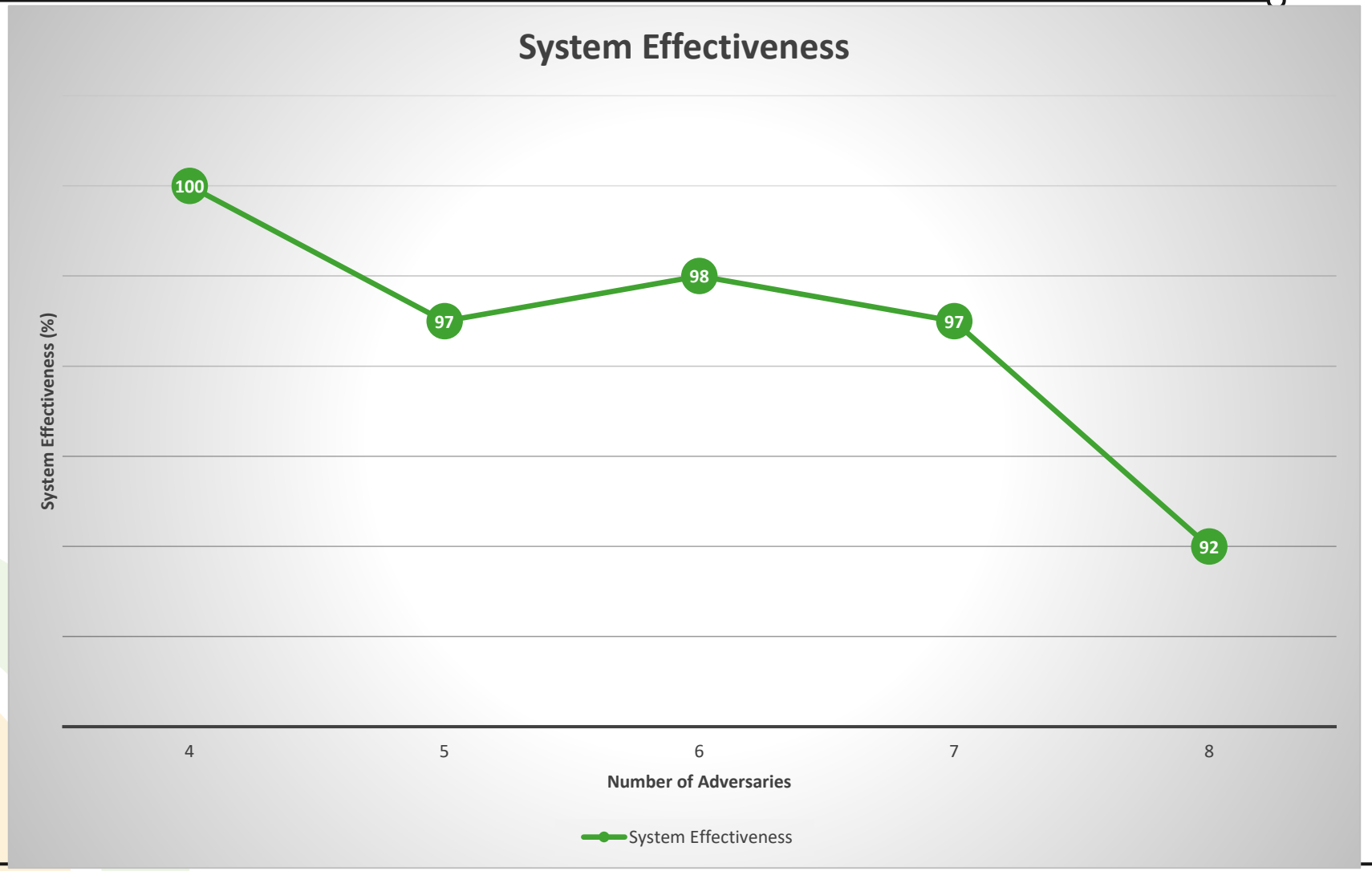




PBR System Effectiveness



PBR Staffing Plan

10 CFR 73 Required Minimum Positions

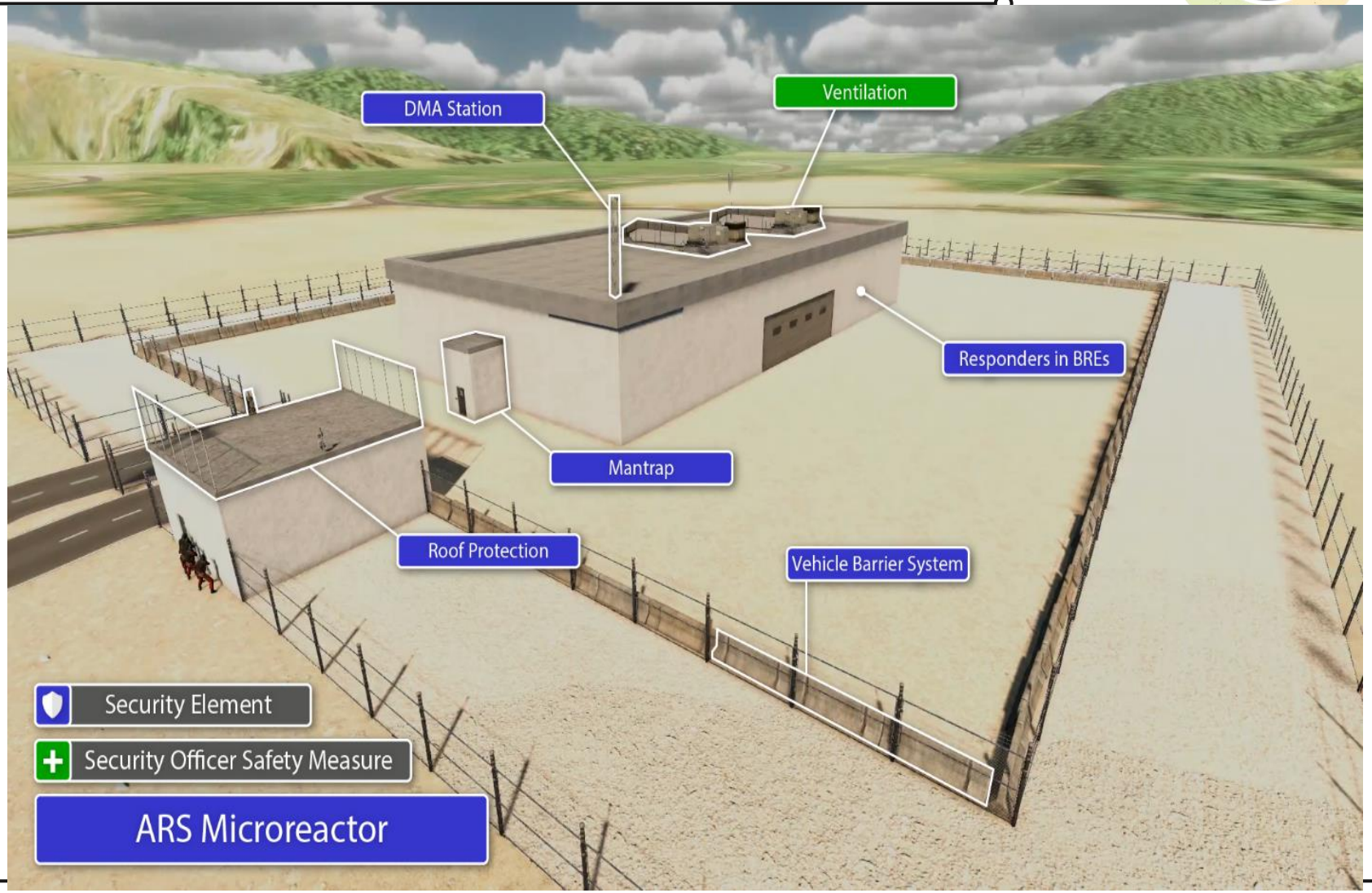
Position	24/7 12 hr. Rotating Shift	40 hrs. Dayshift	FTE
Security Shift Supervisor	1		5
Field Supervisors (One Response Team Leader)	2		9.4
Alarm Station Operators (CAS/SAS)	2		9.4
Armed Responders	10		47
Armed Security Officers (Personnel, vehicle, and material processing)	4		18.8
Owner Controlled Area Rover	1		4.7
Scheduler		1	1
Total	18	1	**90.6**

System Effectiveness Positions (Requiring Exemptions)

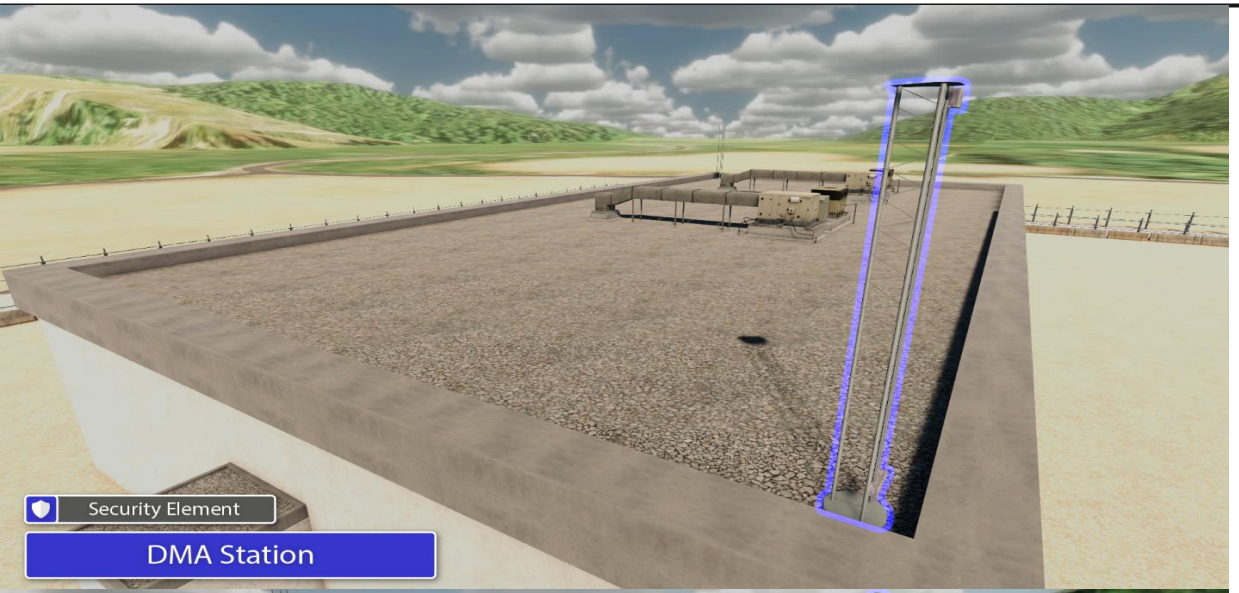
Position	24/7 12 hr. Rotating Shift	FTE
Security Shift Supervisor	1	4.7
Field Supervisors (One Response Team Leader)	2	9.4
Alarm Station Operators (CAS/SAS)	2	9.4
Armed Responders	6	28.2
Armed Security Officers (Personnel, vehicle, and material processing)	3	14.1
Total	14	**65.8**

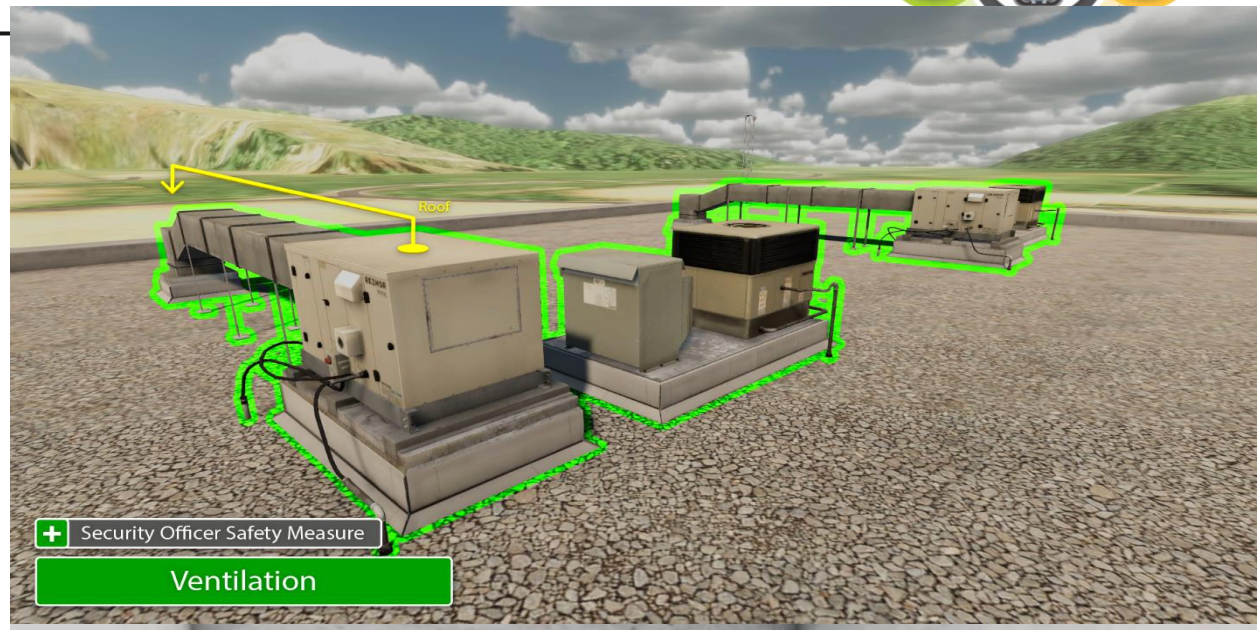
Microreactor

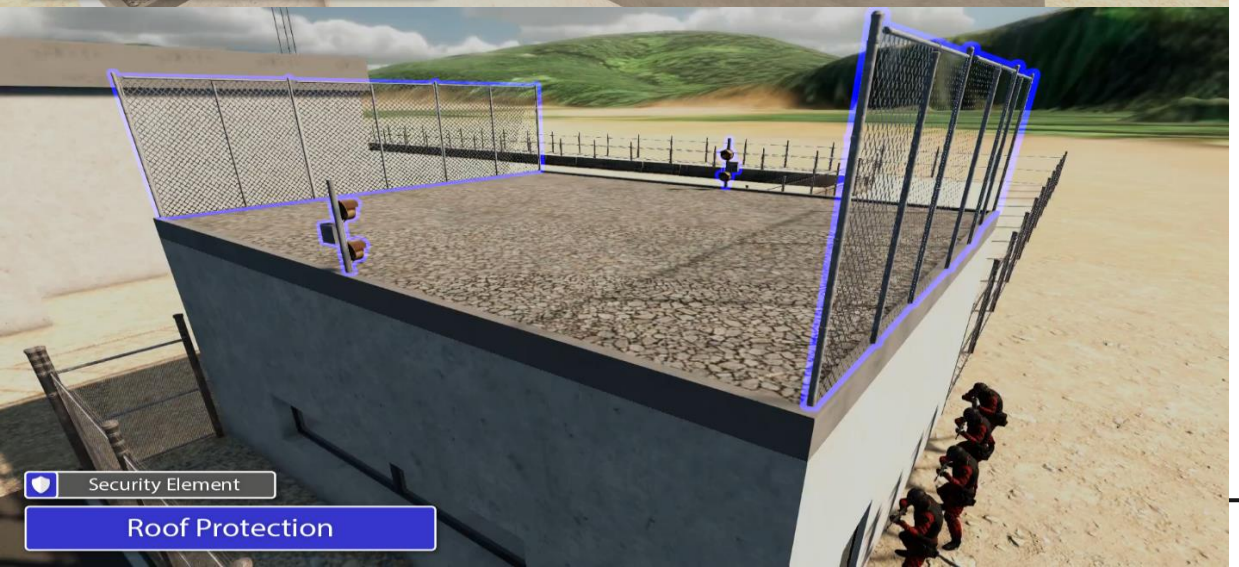
- DMA → External Intrusion Detection
- OCA Boundary
- PA Boundary
- 4 different scenarios analyzed
  - 4 internal responders
  - 3 internal responders
  - 2 internal responders
  - 4 responders in towers
- One ECP
- Two Vital Areas



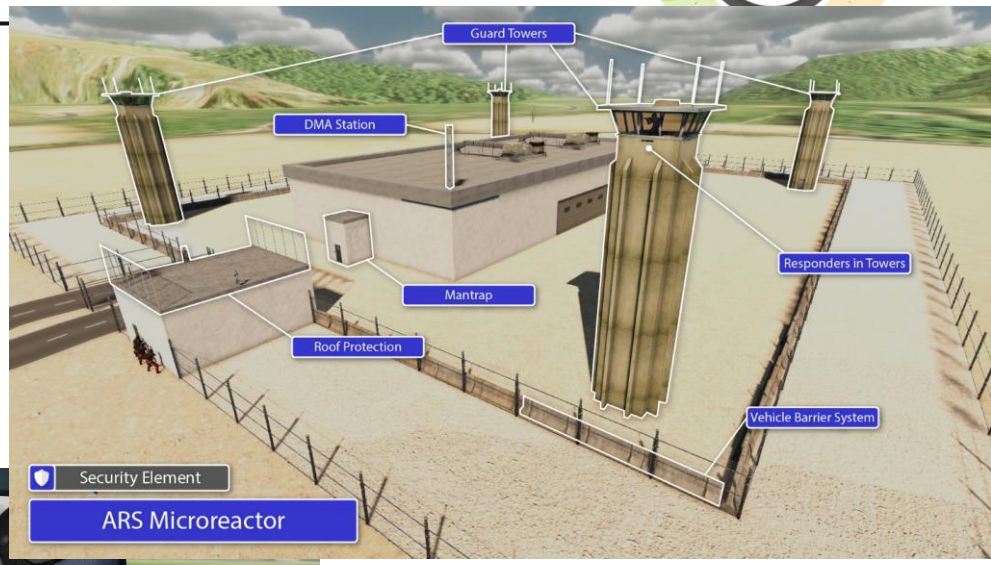
Microreactor PPS Attributes



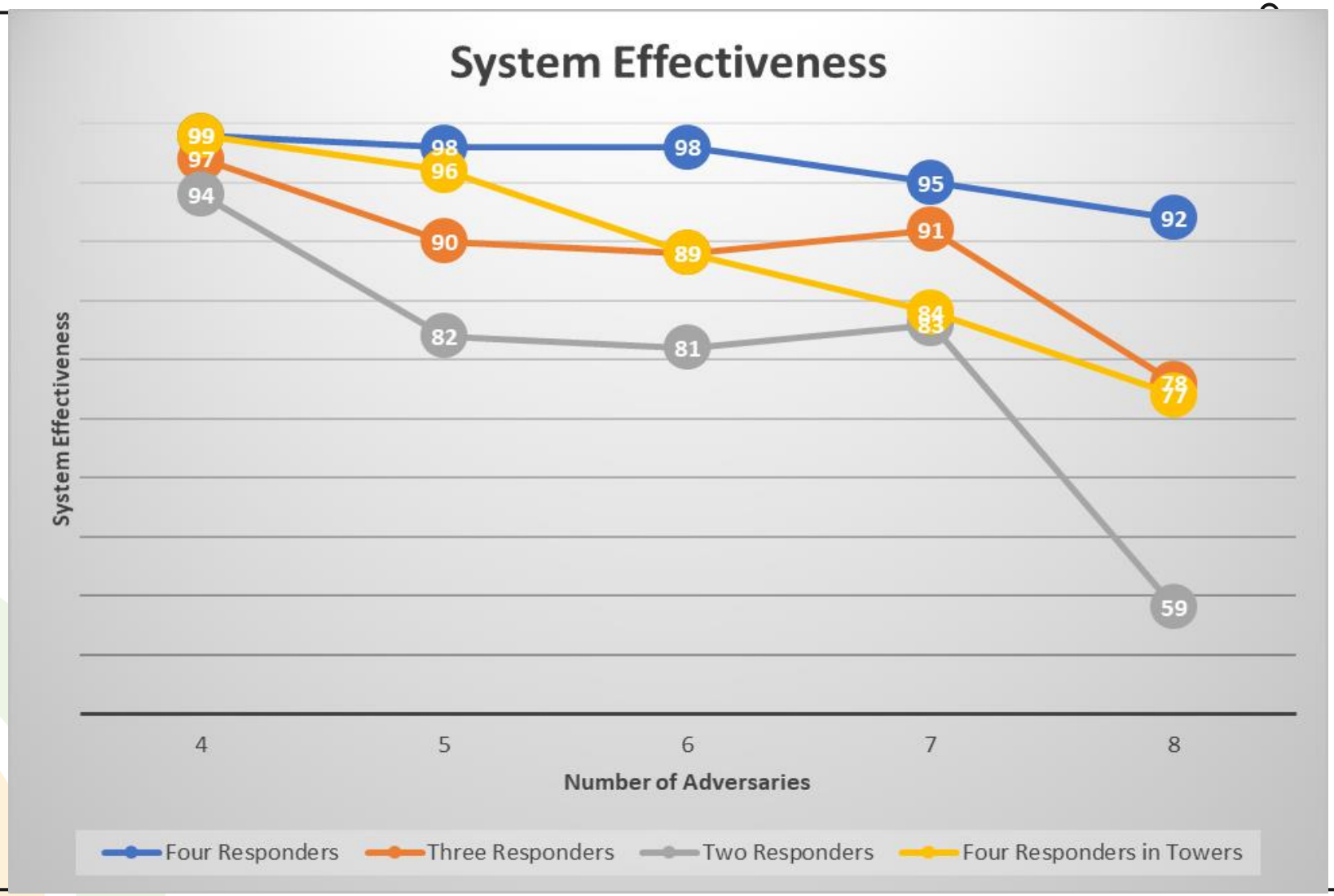




Microreactor PPS Attributes



Microreactor System Effectiveness and Staffing Plan



Microreactor Staffing Plan

10 CFR 73 Required Minimum Positions

Position	24/7 12 hr. Rotating Shift	40 hrs. Dayshift	FTE
Security Shift Supervisor	1		5
Field Supervisors (One Response Team Leader)	2		9.4
Alarm Station Operators (CAS/SAS)	2		9.4
Armed Responders	10		47
Armed Security Officers (Personnel, vehicle, and material processing)	4		18.8
Owner Controlled Area Rover	1		4.7
Scheduler		1	1
Total	18	1	**90.6**

System Effectiveness Positions (Requiring Exemptions)

Position	24/7 12 hr. Rotating Shift	FTE
Security Shift Supervisor	1	4.7
Response Team Lead	1	4.7
Alarm Station Operators (CAS/SAS)	2	9.4
Armed Responders	4 (may reduce one more)	18.8
Armed Security Officers (Personnel, vehicle, and material processing)	2 (may reduce one more)	14.1
Total	10	47

Additional Considerations

- Logistics
  - Food service, restrooms, etc.
- Reducing staff counts
  - Rovers?
  - Armed Security Officers → Cross train and still be effective at responding
    - X versus Y in NRC terminology
- Reducing cost comes in many different forms
  - Reducing work hours
  - Reducing site footprints versus complex intrusion detection systems and traffic flows